

Exercise 14.2

Page: 245

1. The blood groups of 30 students of Class VIII are recorded as follows:

A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O,
A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O.

Represent this data in the form of a frequency distribution table. Which is the most common, and which is the rarest, blood group among these students?

Solution:

Frequency is the number of students having the same blood group. The frequency is represented in the table or the frequency distribution table:

Blood Group	Number of Students (Frequency)
A	9
B	6
O	12
AB	3
Total	30

The most common Blood Group is the blood group with highest frequency: O

The rarest Blood Group is the blood group with lowest frequency: AB

2. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5 3 10 20 25 11 13 7 12 31
19 10 12 17 18 11 32 17 16 2
7 9 7 8 3 5 12 15 18 3
12 14 2 9 6 15 15 7 6 12

Construct a grouped frequency distribution table with class size 5 for the data given above taking the first interval as 0-5 (5 not included). What main features do you observe from this tabular representation?

Solution:

Since the given data is very large, we construct a grouped frequency distribution table of class size 5. \therefore , class interval will be 0-5, 5-10, 10-15, 15-20 and so on. The data is represented in the grouped frequency distribution table as:

Distances (in km)	Tally marks	Frequency
0 - 5		5
5 - 10		11
10 - 15		11
15 - 20		9
20 - 25		1
25 - 30		1
30 - 35		2
Total		40

In the given table the classes do not overlap. Also we find that, the houses of 36 out of 40 engineers are below 20 km of distance

3. The relative humidity (in %) of a certain city for a month of 30 days was as follows:

98.1 98.6 99.2 90.3 86.5 95.3 92.9 96.3 94.2 95.1
 89.2 92.3 97.1 93.5 92.7 95.1 97.2 93.3 95.2 97.3
 96.2 92.1 84.9 90.2 95.7 98.3 97.3 96.1 92.1 89

- Construct a grouped frequency distribution table with classes 84 - 86, 86 - 88, etc.
- Which month or season do you think this data is about?
- What is the range of this data?

Solution:

- Since the given data is very large, we construct a grouped frequency distribution table of class size 2.
 \therefore , class interval will be 84-86, 86-88, 88-90, 90-92 and so on. The data is represented in the grouped frequency distribution table as:

Relative humidity (in %)	Frequency
84-86	1
86-88	1
88-90	2
90-92	2
92-94	7
94-96	6
96-98	7
98-100	4
Total	30

- The humidity is very high in the given data. Since the humidity is observed to be high during the rainy season, the data here must be about rainy season.
- The range of a data = The maximum value of the data - minimum value of the data
 $= 99.2 - 84.9$
 $= 14.3$

4. The heights of 50 students, measured to the nearest centimeters, have been found to be as follows:

161 150 154 165 168 161 154 162 150 151
 162 164 171 165 158 154 156 172 160 170
 153 159 161 170 162 165 166 168 165 164
 154 152 153 156 158 162 160 161 173 166
 161 159 162 167 168 159 158 153 154 159

- Represent the data given above by a grouped frequency distribution table, taking the class intervals as 160 - 165, 165 - 170, etc.
- What can you conclude about their heights from the table?

Solution:

- The data given in the question can be represented by a grouped frequency distribution table, taking the class intervals as 160 - 165, 165 - 170, etc., as:

Height (in cm)	No. of Students (Frequency)
150-155	12
155-160	9
160-165	14
165-170	10
170-175	5

Total	50
-------	----

- (ii) It can be concluded from the given data and the table that 35 students, i.e. more than 50% of the total students, are shorter than 165 cm.

5. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows:

0.03 0.08 0.08 0.09 0.04 0.17
 0.16 0.05 0.02 0.06 0.18 0.20
 0.11 0.08 0.12 0.13 0.22 0.07
 0.08 0.01 0.10 0.06 0.09 0.18
 0.11 0.07 0.05 0.07 0.01 0.04

- (i) Make a grouped frequency distribution table for this data with class intervals as 0.00 - 0.04, 0.04 - 0.08, and so on.
 (ii) For how many days, was the concentration of Sulphur dioxide more than 0.11 parts per million?

Solution:

- (i) The grouped frequency distribution table for the data given in the question with class intervals as 0.00 - 0.04, 0.04 - 0.08, and so on is given below.

Concentration of sulphur dioxide in air (in ppm)	Frequency
0.00 – 0.04	4
0.04 – 0.08	9
0.08 – 0.12	9
0.12 – 0.16	2
0.16 – 0.20	4
0.20 – 0.24	2
Total	30

- (ii) The number of days in which the concentration of sulphur dioxide was more than 0.11 parts per million = 2+4+2 = 8

6. Three coins were tossed 30 times simultaneously. Each time the number of heads occurring was noted down as follows:

0 1 2 2 1 2 3 1 3 0
 1 3 1 1 2 2 0 1 2 1
 3 0 0 1 1 2 3 2 2 0

Prepare a frequency distribution table for the data given above.

Solution:

The frequency distribution table for the data given in the question is given below:

Number of Heads	Frequency
0	6
1	10
2	9

3	5
Total	30

7. The value of π up to 50 decimal places is given below:

3.14159265358979323846264338327950288419716939937510

- Make a frequency distribution of the digits from 0 to 9 after the decimal point.
- What are the most and the least frequently occurring digits?

Solution:

- The frequency distribution of the digits from 0 to 9 after the decimal point is given in the table below:

Digits	Frequency
0	2
1	5
2	5
3	8
4	4
5	5
6	4
7	4
8	5
9	8
Total	50

- The digit having the least frequency occurs the least. Since 0 occurs only twice, it has a frequency of 2. \therefore , The least frequently occurring digit is 0.

The digit with highest frequency occurs the most. Since 3 and 9 occurs eight times, it has a frequency of 8. \therefore , The most frequently occurring digits are 3 and 9.

8. Thirty children were asked about the number of hours they watched TV programmes in the previous week. The results were found as follows:

1 6 2 3 5 12 5 8 4 8
10 3 4 12 2 8 15 1 17 6
3 2 8 5 9 6 8 7 14 12

- Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals as 5-10.
- How many children watched television for 15 or more hours a week?

Solution:

- The grouped frequency distribution table for the data given in the question, taking class width 5 and one of the class intervals as 5-10 is given below:

Number of Hours	Frequency
0-5	10
5-10	13
10-15	5
15-20	2
Total	30

(ii) From the given table, we can conclude that 2 children watched television for 15 or more hours in a week.

9. A company manufactures car batteries of a particular type. The lives (in years) of 40 such batteries were recorded as follows:

2.6 3.0 3.7 3.2 2.2 4.1 3.5 4.5
3.5 2.3 3.2 3.4 3.8 3.2 4.6 3.7
2.5 4.4 3.4 3.3 2.9 3.0 4.3 2.8
3.5 3.2 3.9 3.2 3.2 3.1 3.7 3.4
4.6 3.8 3.2 2.6 3.5 4.2 2.9 3.6

Construct a grouped frequency distribution table for this data, using class intervals of size 0.5 starting from the interval 2 - 2.5.

Solution:

The grouped frequency distribution table for the data given in the table, using class intervals of size 0.5 starting from the interval 2 - 2.5, is given below.

Lives of batteries (in years)	No. of batteries (Frequency)
2-2.5	2
2.5-3	6
3-3.5	14
3.5-4	11
4-4.5	4
4.5-5	3
Total	40